

CLAIMS

I claim:

1. A transport and splicing apparatus under the control of a computer,
for supplying successively used rolls of web material to at least one web utilizing
device from the roll unwinding devices associated therewith,
5 as an uninterrupted, continuously feeding web,
by splicing said web from an at least partially depleted dispensing first roll of web
material in said unwinding device,
to a replacement second roll supplied by said transport and splicing apparatus
consisting essentially of :
10 coreshaft means rigidly assembled into the central cores of said first and second rolls,
a roll transport vehicular means, engaged by an operative roll positioning means for
rotatably engaging and positioning said second roll and coreshaft means assembly
into a predefined spatial relation to said dispensing first roll of material,
15 a driving means for operatively controlling the rotation of said second roll,
an operative splicing and web-severing means attached to said roll transport
vehicular means by a pair of articulated arm means,
operative arm means supported by said roll transport vehicular means,
to engage and remove the first roll assembly from said unwind device,
20 said operative roll positioning means thereafter moving said assembly into the former
position of said first roll in said unwind device,
thereby converting said replacement second roll into a dispensing first roll.
2. A roll transport vehicular means consisting essentially of:
25 a transport vehicle including a frame structure, computer controls,
operator controls, battery, operative roll positioning means, operative roll
rotation means, splicing and severing means, a roller, roller positioning means, and
supporting wheels,
acting in combination to transport a second roll of material from a storage location
30 into a predefined spatial relation with a first dispensing roll in an unwind device, and
adapted to perform a flying splice with said first roll, and
to thereafter replace said first roll with said second roll.

3. The apparatus in **claim 1** wherein said operative roll positioning means attached to said roll transport vehicular means consists of:
- 35 a pair of gripper bars, each bar supporting an operative coreshaft gripper,
one gripper disposed at a first end of said coreshaft, and one gripper
disposed at a second end of said coreshaft,
to engage and position said second roll coreshaft,
while allowing said coreshaft to rotate about its axis and within said grippers,
40 where each of said gripper bars is operatively positioned by actuators and levers
responsive to signals from said computer,
the circumferential outer surface of said second roll thereby being moved into
proximal juxtaposition with said dispensing first roll,
prior to the beginning of the splice cycle.
- 45 4. The apparatus as described in claim 1, wherein the driving means to control the
rotation of said second roll consists of:
an electronic motor-drive means responsive to a speed-signal calculated by said
computer primarily based on the arithmetic quotient of the indicated web
utilization velocity from a sensor located on the web utilizing device, divided
50 by the indicated diameter of said second roll from a sensor located on said
transport and splicing apparatus,
said a motor being provided with a rotary drive means coupled to said coreshaft to
operatively control the rotation of said coreshaft,
so disposed that said motor rotates said second roll at a surface velocity
55 approximating the web utilization velocity during the time before the splice
cycle,
and during the time after the splice cycle,
said motor-drive signal from said computer generally being a braking-torque
signal based on the indicated web tension to the computer from a sensor
60 located in said web utilizing device,
whereby the rotational velocity of said second roll regulates an essentially
constant web tension during and after the splice cycle.

5. The apparatus as described in claim 1 wherein said splicing and web-severing means consists essentially of:

65 a pair of pivoted, spaced and parallel splicing arms, attached to said transporting and splicing apparatus,
said apparatus also supporting operative actuators to position each of said splicing arms,
each arm supporting an operatively pivoted bracket,
70 said brackets supporting a first and second end of an operatively rotatable idler roller shaft,
said shaft supporting on bearings a rotatable idler roller,
said roller being so disposed as to redirect the path of the web during the splice cycle so disposed that said web contacts the outer circumferential surface of
75 said first roll to cause an adhesive area on said outer wrap to be forcibly contacted by said web,
thereby forming a splice, and
said shaft also having clamped rigidly thereto at each end,
a pair of clamping blocks supporting a web severing means,
80 said severing means being comprised of an elongated, serrated blade each end of which is attached to said blocks
to operatively sever the dispensing web and splice in combination from said first roll of material.

6. The apparatus as described in claim 1, wherein the means to remove said second roll after the splicing cycle consists essentially of:

85 a pair of splicer arms adapted to support and position each end of said splicing and severing mechanism into parallel proximal juxtaposition to said second roll,
and also to pivotably support and position a pair of splicing roller brackets,
90 said brackets rotatively supporting a splicing roller,
said splicing roller being adapted to redirect the path of the unwinding web, such that the web contacts said first roll, thereby forming a splice,
and after the splice cycle is completed,
said roller and said bracket assembly grasps said second roll and the coreshaft
95 located therein,
the pair of splicer arms thereafter being moved in a path such that said roller and bracket assembly in combination with said second roll support and thereby, are removed from said unwind device.

- 95 7. The apparatus as described in claim 1, including computer operative means for automatically aligning the supporting mechanism of said first roll with said second roll such that the center-lines of said first roll and said second roll are parallel and the faces of both rolls are coplanar.
8. The apparatus as described in claim 1, including an elevating mechanism being
100 provided to raise the roller supporting, loading, splicing and core retrieval mechanisms such that upper levels of a multilevel unwind device may be serviced by said apparatus.
9. The apparatus as described in claim 1 including signal broadcasting and receiving
105 means attached to said vehicular means and the web utilizing device, to provide operational information including, but not limited to, web utilization speed, the diameters of the dispensing rolls, and emergency stops, and to automatically guide said vehicular means into a predetermined spatial relation to said unwinding devices.
- 110 10. The apparatus as described in claim 1 wherein rolls of material having a variety of characteristics may be successively supplied to a variety of web utilizing devices.
11. The apparatus as described in claim 1, wherein the coreshaft means is comprised of: a pair of selectively operative core chucks, internally engaging said rolls of material in the center of each end of said second roll,
115 said chucks being selectively engaged and supported by a pair of spaced, parallel, and operatively pivoted chuck arms, said chuck arms being so disposed as to operatively place said chucks into the center of said second rolls, whereby said operative arm means may subsequently engage, lift and position said second rolls during the transport, splicing, and positioning of said second 120 rolls into a pair of rotatable engagement means in said unwind device, so disposed at each end of said rolls as to rotatably engage said chucks, and after said first rolls are spliced, said chuck arms are so disposed as to engage and remove said first roll assembly from said unwind device, said operative arm means thereafter moving said second roll assembly into the former
125 position of said first roll in said unwind device, thereby converting said replacement second roll into a dispensing first roll.